

Claims

We claim:

- 1           1. A method of treating a behavioral or psychological deficit in an animal which  
2 comprises intracerebral transplantation of a therapeutically effective amount of pluripotent  
3 neuroepithelial cells to said animal.
- 1           2. The method of claim 1, wherein tests for cognitive function are carried out before  
2 and after transplantation of said pluripotent neuroepithelial cells.
- 1           3. The method of claim 1, wherein said cells are conditionally immortal.
- 1           4. The method of claim 1, wherein said cells are isolated.
- 1           5. The method of claim 1, wherein said animal is a human.
- 1           6. The method of claim 1, wherein said cells are from a single cell line.
- 1           7. The method of claim 1, wherein said cells are a mixture of cells from two or more  
2 cell lines.
- 1           8. The method of claim 1, wherein said cells have a high degree of potency.
- 1           9. The method of claim 1, wherein the proliferation of said cells is increased by the  
2 addition of FGF2 *in vitro* under both permissive and non-permissive conditions.

1           10. The method of claim 1, wherein said cells differ from those found in nature only  
2           in that said cells comprise exogenous DNA necessary to provide conditional immortality,  
3           and optionally to allow cloning.

1           11. The method of claim 1, wherein said behavioral or psychological deficit is the  
2           result of hypoxia.

1           12. The method of claim 1, wherein said cells are human cells.

1           13. Pluripotent, neuroepithelial cells for therapeutic treatment of an animal.

1           14. The cells of claim 13, wherein said cells are for therapeutic treatment of a  
2           behavioral or psychological deficit of said animal.

1           15. The cells of claim 13, wherein said cells are conditionally immortal.

1           16. The cells of claim 13, wherein said cells are isolated.

1           17. The cells of claim 13, wherein said animal is a human.

1           18. The cells of claim 13, wherein said cells are from a single cell line.

1           19. The cells of claim 13, wherein said cells are a mixture of cells from two or more  
2           cell lines.

1           20. The cells of claim 13, wherein said cells have a high degree of potency.

1           21. The cells of claim 13, wherein the proliferation of said cells is increased by the  
2           addition of FGF2 *in vitro* under both permissive and non-permissive conditions.

1           22. The cells of claim 13, wherein said cells differ from those found in nature only  
2           in that said cells comprise exogenous DNA necessary to provide conditional immortality,  
3           and optionally to allow cloning.

1           23. The cells of claim 14, wherein said behavioral or psychological deficit is the  
2           result of hypoxia.

1           24. The cells of claim 13, wherein said cells are human cells.

1           25. A conditionally immortal, pluripotent, neuroepithelial cell line for therapeutic  
2           treatment of an animal.

1           26. The cell line of claim 25, wherein said cell line is for the treatment of a behavioral  
2           or psychological deficit of said animal.

1           27. The cell line of claim 25, wherein said animal is a human.

1           28. The cell line of claim 25, wherein said cell line is from a single cell line.

1           29. The cell line of claim 25, wherein said cell line is a mixture of cells from two or  
2           more cell lines.

1           30. The cell line of claim 25, wherein cells of said cell line have a high degree of  
2           potency.

1           31. The cell line of claim 25, wherein the proliferation of said cell line is increased  
2           by the addition of FGF2 *in vitro* under both permissive and non-permissive conditions.

1           32. The cell line of claim 25, wherein said cell line differs from cells found in nature  
2 only in that cells of said cell line comprise exogenous DNA necessary to provide conditional  
3 immortality, and optionally to allow cloning.

1           33. The cell line of claim 26, wherein said behavioral or psychological deficit is the  
2 result of a transient loss of blood supply to the brain of said animal.

1           34. The cell line of claim 25, wherein cells of said cell line are human cells.

1           35. A process for the production of human, conditionally immortal, pluripotent,  
2 neuroepithelial cells which comprises the steps of:

3                   (a) obtaining neuroepithelial cells from a human fetus, said neuroepithelial  
4 cells being at a stage early enough in the developmental pathway that said  
5 neuroepithelial cells have the ability to differentiate into a variety of different brain  
6 cell types;

7                   (b) introducing into said neuroepithelial cells DNA which comprises a  
8 sequence capable of causing said neuroepithelial cells to be conditionally immortal  
9 under the control of appropriate control elements; and

10                  (c) maintaining said neuroepithelial cells *in vitro* under permissive conditions.

1           36. The process of claim 35, which further includes the step of cloning said  
2 neuroepithelial cells to obtain one or more cell lines.

1           37. A pharmaceutical composition comprising cells of claim 13 and a  
2 pharmaceutically acceptable carrier.

1           38. A pharmaceutical composition comprising cells from the cell line of claim 25  
2 and a pharmaceutically acceptable carrier.

1           39. A pharmaceutical composition comprising cells obtained according to the  
2 process of claim 64 and a pharmaceutically acceptable carrier.

1           40. A method of testing comprising maintaining a population of cells of a  
2 conditionally immortal pluripotent neuroepithelial cell line *in vitro* and culturing portions  
3 of said cells under permissive conditions in the presence and absence of a growth factor and  
4 determining the proliferation of the cells.

1           41. The method of testing according to claim 40, which further comprises culturing  
2 portions of said cells under non-permissive conditions in the presence and absence of a  
3 growth factor and determining the proliferation of said cells.

1           42. A mammal which has undergone the method of treatment according to claim 1.

1           43. A cell line comprising conditionally immortal, pluripotent, neuroepithelial stem  
2 cells, wherein said cell line is obtainable by culturing said stem cells under permissive  
3 conditions in serum-free medium.

1           44. The cell line of claim 43, wherein said serum-free medium comprises a growth  
2 factor.

1           45. The cell line of claim 44, wherein said growth factor is FGF2.

1           46. Cells obtainable from a cell line of claim 43.

1           47. The cells according to claim 46, wherein said cells are for use in a method of  
2 therapeutic treatment of an animal.

1           48. The cells according to claim 47, wherein said therapeutic treatment is a treatment  
2 of a behavioral or psychological deficit of said animal.

1           49. A method of treating an animal having a damaged brain, said method comprising  
2 intracerebral transplantation of a therapeutically effective amount of a cell line into the  
3 damaged brain of said animal, said cell line comprising conditionally immortal, pluripotent,  
4 neuroepithelial stem cells, wherein said cell line is obtainable by culturing said stem cells  
5 under permissive conditions in serum-free medium into the damaged brain of said animal.

1           50. The method of claim 49, wherein said serum-free medium comprises a growth  
2 factor.

1           51. The method of claim 49, wherein said growth factor is FGF2.

1           52. A method for treating a behavioral or psychological deficit caused by damage  
2 to, or loss of, brain cells in a mammal which comprises intracerebral transplantation to said  
3 mammal of undifferentiated pluripotent cells having neuronal and glial potential, wherein  
4 said transplanted cells migrate and differentiate to replace, or compensate for, said lost or  
5 damaged brain cells.

1           53. The method of claim 52, wherein said undifferentiated pluripotent cells are  
2 conditionally immortal.

1           54. The method of claim 52, wherein said undifferentiated pluripotent cells are  
2 nestin-positive prior to said intracerebral transplantation.

1           55. The method of claim 52, wherein said undifferentiated pluripotent cells are from  
2 a clonal cell line.

- 1                   56. The method of claim 52, wherein said behavioral or psychological deficit is the
- 2                   result of hypoxia.